

REMARKS

Overview of the Office Action

Claims 1-7 have been rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 4,935,665 ("Murata") in view of Japanese Patent Pub. No. JP2001085748 ("Kimura"), and further in view of US Patent Appl. Pub. No. 2003/0122247 ("Joshi").

Claims 1, 2, 6 and 8 have been rejected under 35 U.S.C. §103(a) as unpatentable over Murata in view of U.S. Patent No. 6,545,332 to Huang ("Huang").

Status of the claims

Claim 1 has been amended.

Claims 9-12 have been newly added

Claims 1-12 are now pending.

Summary of subject matter disclosed in the specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The disclosed light source module includes a plurality of LEDs 1 connected to a metal carrier 4 by an insulating layer 3 (see page 4, lines 7-19; and Fig. 1 of the application as filed). To form a reflector, the LEDs are surrounded by a frame 10 (see page 5, lines 8-12). To protect against mechanical effects caused by different thermal expansion rates, the frame 10 is segmented into a plurality of parts by expansion joints 13, which include separating cuts 13a (see page 6, lines 8-22). Stresses occurring as a result of temperature fluctuations are absorbed by the

expansion joints. Further, a printed circuit board 8 is arranged between the frame 10 and the metal carrier 4 for electrically connecting the LEDs (see page 5, lines 1-6). The printed circuit board is a separate element, which typically includes an electrically insulating base plate with conductor paths.

Claims 1-7 are allowable over Murata, Kimura, and Joshi under 35 U.S.C. § 103(a)

The Office Action states that the combination of Murata, Kimura, and Joshi teaches all of the elements recited in Applicants' claims.

Independent claim 1 has been amended to recite, "a light source module having a plurality of LEDs connected to a metal carrier in an insulating manner, the LEDs being surrounded by a frame, potting composition being arranged between the frame and the LEDs and the frame having expansion joints with a separating cut being provided in the expansion joints, wherein a printed circuit board is arranged between the frame and the metal carrier for electrically connecting the LEDs. Support for the claim amendment can be found on page 5, lines 14-15 of Applicants' specification.

Murata, Kimura, and Joshi, whether taken alone or in combination, fail to teach or suggest, "wherein a printed circuit board is arranged between the frame and the metal carrier for electrically connecting the LEDs", as recited in Applicants' amended claim 1.

Murata discloses a light emitting diode lamp having an insulated metallic board 1 with a plurality of hollows 11 and a light emitting diode 2 mounted on the bottom of each hollow 11 (see col. 3, lines 25-29 of Murata). The insulated metallic board 1 consists of a metallic layer 12, an electrically insulating layer 13, pole patterns 15 and lead patterns 16 (col. 3, lines 32-41). The pole patterns 15, which are arranged on the electrically insulating layer 13, are used to

electrically connect the LEDs 2. Nowhere in Murata is it taught or suggested that the pole patterns 15 and the electrically insulating layer 13 form a printed circuit board. Moreover, it is not obvious in view of the teaching of Murata to use a printed circuit board for the electrically insulating layer 13 and the pole patterns 15 because hollows 11 are provided in the insulated metallic board 1. In order to produce the hollows 11 of Murata, methods such as mechanical digging and drawing are employed (see col. 3, line 58-66) of Murata. It is known to those skilled in the art that such methods require bending the metallic board 1, which includes the pole patterns 15 and the electrically insulating layer 13. Murata makes no mention of using a bendable printed circuit board on the metallic board 1. Therefore, Murata fails to teach or suggest “wherein a printed circuit board is arranged between the frame and the metal carrier for electrically connecting the LEDs”, as recited in Applicants’ amended claim 1.

Kimura teaches a light-emitting device with a substrate and a frame, wherein LEDs are arranged in holes of the frame on the substrate. Although Kimura teaches that the substrate can be a printed circuit board, the substrate is a flat plate. Kimura does not teach or suggest that the substrate (i.e., flat plate) can be bent, which is a requirement for the insulated metallic board 1 of Murata. Since the device of Murata teaches that the pole patterns 15 and lead patterns 16 are arranged directly on the insulated metallic board, there is no motivation teaching or suggestion for arranging the substrate of Kimura between the frame and the insulated metallic board of Murata. Accordingly, the combination of Murata and Kimura fail to teach or suggest “wherein a printed circuit board is arranged between the frame and the metal carrier for electrically connecting the LEDs”, as recited in Applicants’ amended claim 1.

Joshi teaches a multi-chip flip chip package with a plurality of lead frames 104 (see paragraph [0023] and Figs. 2-3 in Joshi). The plural lead frames 104 are arranged on a base

frame 100 (see Figs. 2-3). Even if the lead frames 104 of Joshi were arranged on the insulated metallic board 1 of Murata, the combination still fails to teach or suggest a printed circuit board for electrically connecting the LEDs because (1) Joshi does not teach or suggest that the lead frames 104 can be bent, as is required by Murata, and (2) Joshi fails to teach or suggest that the lead frames connect the LEDs. In contrast, each lead frame 104 is designed for a single chip and further interconnections between the various lead frames are required to connect the chips (see paragraph [0025] of Joshi). Accordingly, the combined teachings of Murata and Joshi fail to teach or suggest “wherein a printed circuit board is arranged between the frame and the metal carrier for electrically connecting the LEDs”, as now expressly recited in independent claim 1.

In view of the foregoing, it is respectfully submitted that Murata, Kimura, and Joshi whether taken alone or in combination, do not teach or suggest the subject matter recited in Applicants’ amended independent claim 1. Accordingly, claim 1 is patentable Murata, Kimura, and Joshi under 35 U.S.C. §103(a).

Dependent claims

Claims 2-7, which depend from independent claim 1, incorporate all of the limitations of independent claim 1 and are, therefore, deemed to be patentably distinct over Murata, Kimura, and Joshi for at least those reasons discussed above with respect to independent claim 1.

Claims 1, 2, 6, and 8 are allowable over Murata and Huang under 35 U.S.C. § 103(a)

The Office Action states that the combination of Murata and Huang teaches all of the elements recited in Applicants’ claims.

Murata has been previously discussed, and fails to teach or suggest, “wherein a printed circuit board is arranged between the frame and the metal carrier for electrically connecting the LEDs”, as recited in Applicants’ amended claim 1.

Huang teaches an image sensor of a quad flat package built on a lead frame 100 with a die pad 102 and leads 104 (see col. 3, lines 61-64 of Huang). Since the package disclosed by Huang is for a single chip, Huang fails to disclose a printed circuit board for connecting chips. Accordingly, Huang also fails to teach or suggest, “wherein a printed circuit board is arranged between the frame and the metal carrier for electrically connecting the LEDs”, as recited in Applicants’ amended claim 1.

In view of the foregoing, it is respectfully submitted that Murata and Huang, whether taken alone or in combination, do not teach or suggest the subject matter recited in Applicants’ amended independent claim 1. Accordingly, claim 1 is patentable over Murata and Huang under 35 U.S.C. §103(a).

Independent claim 8 recites limitations similar to amended independent claim 1 and is, therefore, patentable over Murata and Huang for reasons discussed above with respect to amended claim 1.

Dependent claims

Claims 2 and 6, which depend from independent claim 1, incorporate all of the limitations of independent claim 1 and are, therefore, deemed to be patentably distinct over Murata and Huang for at least those reasons discussed above with respect to independent claim 1.

Newly added claims 9-12

Claims 9-12 have been newly added. Support for claim 9 can be found in Applicants' specification on page 8, first paragraph. Support for claim 10 can be found in Applicants' specification on page 5, first paragraph and Fig. 1. Support for claim 11 can be found in Applicants' specification on page 4, lines 8-10. Support for claim 12 can be found Applicants' specification on page 5, first paragraph.

Claims 9-12, which depend from independent claim 1, incorporate all of the limitations of independent claim 1 and are, therefore, deemed to be patentably distinct over Murata, Kimura, Joshi, and Huang for at least those reasons discussed above with respect to independent claim 1.


Conclusion

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of all rejections, and allowance of all pending claims in due course.

Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

Respectfully submitted,

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